# 1 - TASTE PERCEPTION ELDERLY HYPERTENSION AND DIABETES

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## INTRODUCTION

Although aging is one of the greatest achievements of mankind, also poses a serious challenge to society in different countries, particularly those in development, as is the case in Brazil. Aging, despite being a natural process the body undergoes several anatomical and physiological. These changes further deteriorate the quality of life of the elderly, since they affect the health and nutrition of the same (SASS et al., 2004).This series of anatomical and functional changes that occur with the elderly is relevant to the nutritional aspects of the same. For changes such as smell, taste and vision negatively influence food intake (MONTEIRO, 2009).

In old age, one of the main factors in the decrease of food consumption is the reduction of sensitivity by primary tastes sweet, bitter, sour and salty (ROLLS, 1992; NOGUÉS, 1995; SHUMAN, 1998). Recent studies show that old people have difficulty to detect the sweet taste of the food predisposes more to sweeten foods, and similar behavior occurs with the salty taste. The elderly tend to concentrate the flavor of food to fit the palate, which is abnormal (KINA, 1998).

The changes inherent in the process of aging does not mean illness, but the probability of its appearance to pathological processes increases with age, since aging makes people more vulnerable, featuring senility. However, the elderly represent a group at high risk for certain systemic diseases, depending on the physiological changes incurred due to the aging process (MARQUES, 2006). Some of these diseases are often found, such as high blood pressure (HBP), diabetes mellitus and heart failure (KUSUMOTA, RODRIGUES, MARQUES, 2004).

The increased incidence of diabetes in the world has been linked to changes in lifestyle and the environment brought about by industrialization. Hypertension is also a common chronic problem. Its prevalence is high and increases in older age groups. Epidemiological studies estimate the prevalence of 40% to 50% of the adult Brazilian population over 40 years, from the cuff pressure (TOSCANO, 2004).

Therefore, aging, despite being a natural process the body undergoes several anatomical and functional, with repercussions on health and nutrition of the elderly. Many of these changes are progressive, resulting in effective reductions in functional capacity, since the sensitivity to the primary tastes to the body's metabolic processes (AMERINO et al., 1965).

Thus, this study aimed to evaluate the relationship of hypertension and diabetes with the taste sensitivity in elderly people who attend the best age groups.

## METHOD

It is a cross-sectional study whose target population was elderly in the public best age groups in the city of Indaial and Blumenau, Santa Catarina. 50 volunteers were used for the study, which signed a consent form.

Volunteers have proven solutions of NaCl and sucrose from the lower solute concentration of the element to the highest taste. The solutions of NaCl and sucrose were manufactured in the laboratory of Metropolitan College of Blumenau. The calculation of the weight of the substances was carried out according to the volume and concentration of the solutions. Was used for weighing the balance of specific substances, glass and funnel glass Becker. After weighing, the substances were diluted in water according to the calculations of concentrations, packed in sealed plastic bottles in a dry, without light and at room temperature.

All participants answered a questionnaire (Appendix A) investigating the presence of diseases and other factors, such as the use of dental prosthesis, tobacco and medicines, which can interfere with the taste according to the literature.

*- Preparation of solutions*

Solutions were prepared in two basic flavors (sweet, salty) in different concentrations and progressive, starting from low concentrations to higher concentrations. Each solution was prepared in the following variations of concentration: sucrose (sweet): 5-55 mM / L and sodium chloride (salt): 5-55 mM / L. These concentrations are shown in Table 1.

| Solutions mM/l e g | |
|---|---|
| Sucrose | NaCl |
| 5 mM/l = 3,42g | 5 mM/l = 0,58g |
| 10 mM/l = 10,26g | 15 mM/l = 1,75g |
| 25 mM/l = 17,4g | 25 mM/l = 2,92g |
| 35 mM/l = 23,94g | 35 mM/l = 4,09g |
| 45 mM/l = 30,78g | 45 mM/l = 5,26g |
| 55 mM/l = 37,62g | 55 mM/l = 6,43g |

**Table 1 - Concentration of solutions (mM / leg).**

*- Test of taste sensitivity*

Taste sensitivity tests measure the ability to perceive, identify and / or differentiate qualitative and / or one or more stimuli quantitatively by the sense organs (ABNT, 1994; DUTCOSKY, 2007).

To evaluate LSGS (Gustatory Threshold Sensitivity to salt), we used solutions of sodium chloride (NaCl) and sucrose in increasing concentrations ranging from the lowest concentration 5 mol / L and the highest concentration of 55 mol / L, using mathematical calculation to obtain the weight of solute concentration used.

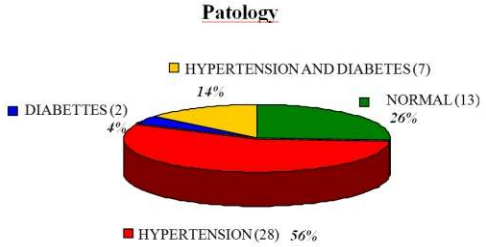
The volunteer has proven solution until a distinct taste that was reported in low concentration and / or until they recognize the taste of the solution. These solutions are offered as follows: in the same glasses, the unidentified volunteer, and

presented in a standardized manner, so as not to induce him to an answer. The lowest concentration of NaCl and sucrose recognized was considered taste recognition threshold.

**RESULTS AND DISCUSSION**

The paper presented an overview of the sensory responses of a sample of normal adults with hypertension or diabetes, in relation to detection thresholds of sweet and salty tastes. We analyzed 50 elderly, mean age 68.5 years, 90% female and 5% male. Of the volunteers surveyed respondents were chronic degenerative diseases, diabetes and hypertension, where the chart below (Figure 1) shows the distribution of pathologies found in the group studied.

**Chart 01: Distribution of pathologies found in the elderly surveyed in April, 2011.**




In relation to hypertension, the data obtained in the experiment were similar to those described by the Brazilian Society of Hypertension (SBH). According to the SBH (2002), approximately 65% of elderly people are suffering from hypertension, and among women over 65 years, the prevalence may reach 80%. Thus, whereas in 2025 there will be more than 35 million seniors in the country, the number of people with high blood pressure tends to increase (SBH, 2002).

In developed countries, cardiovascular diseases are responsible for half the deaths, in addition, are the leading cause of death in the Brazilian population over 30 years. Among these diseases, hypertension is the most common worldwide, being responsible for high rates of morbidity and mortality, especially among the elderly (SBH, 2002). Thus, in a context of important regional and social inequalities, the elderly do not find adequate support in the public health and welfare, accumulate sequelae of systemic diseases, develop disability and lost independence and quality of life, increasing more likely to develop other diseases (CHAIMOWICZ, 1997).

In relation to diabetes, according to Franco and Sartorelli (2003), a study conducted in 1988 in nine state capitals showed that the prevalence of diabetes in urban population between 30 and 69 years of age is 7.6 and 7 8%, respectively. It was observed that the previously diagnosed cases of diabetes accounted for 54% of identified cases, ie 46% of existing cases know the diagnosis, which would probably be made on the occasion of the manifestation of a chronic complication of diabetes. In Brazil, the cities of South and Southeast regions, considered to enhance the economic development of the country, have higher rates of diabetes mellitus (SARTORELLI, FRANCO, 2003), which is in accordance with the data obtained, since the group analyzed 18 % of seniors have diabetes.

Thus it is worth noting that diabetes mellitus and hypertension are highly prevalent diseases in the elderly, becoming factors in the morbidity and mortality of the population. And the aging population, the survival of patients with these diseases, urbanization and industrialization, physical inactivity, genetic predisposition and obesity contribute to the increasing prevalence and incidence of these diseases (CAMARGO, MACHADO; RODRIGUES, 2009).

With regard to taste sensitivity shown in Table 01 the average overall recognition threshold for sweet and salty tastes, prepared with solutions of sucrose and NaCl, detected by normal and elderly hypertensive patients.

| | ***NaCl*** | ***Sacarose*** |
|---|---|---|
| Normal | 14,62 mM/l[a] | 23,75 mM/l |
| Hypertenion | 15,93 mM/l[b] | 19,11 mM/l |

**Table 01: Average of the perception of normal and hypertensive elderly in solutions of NaCl and sucrose.**

In the above table, compared with the normal elderly with hypertension, there was statistical difference in the taste sensitivity threshold detected for the solution of NaCl. Already, when comparing the values of sensitivity to sucrose in the normal population of elderly hypertensive patients showed no difference statistically significant.

One factor that contributes most to the decrease of food consumption among the elderly is to reduce sensitivity to primary taste. Thus, the old people have difficulty to detect the sweet taste inclines more to sweeten foods, similar behavior occurs with the salty taste. If there is appropriate intervention, these situations are likely to trigger, in the long term, along with other factors, tables of hypertension and diabetes, or even hinder its management (STEPS, 2010). In researching similar data were found for sensitivity to NaCl, since the same can not be observed on the threshold of detection sensitivity to sucrose.

The data comparison of threshold sensitivity to NaCl and sucrose of normal elderly with the two that have associated diseases, hypertension and diabetes, there is the table 02.

| *c* | ***NaCl*** | ***Sacarose*** |
|---|---|---|
| Normal | 14,62 mM/l | 23,75 mM/l |
| Hipertension and Diabetes | 13,57 mM/l | 17,86 mM/l |

**Table 02: Average of the perception of normal elderly with hypertension and diabetes in x solutions of NaCl and sucrose.**

The averages found for taste sensitivity to NaCl and sucrose were not statistically significant, so the group of hypertensive and diabetic patients showed no evidence of taste disorders.

In relation to the group that only had diabetes, was not achieved a significant number of elderly (n = 2) to characterize a sample from the 50 elderly studied.

**FINAL CONSIDERATIONS**

When we conduct research with elderly normal, hypertensive and diabetic patients, concluded that it is a significant population of elderly hypertensive patients (70%) in groups with greater age of Blumenau and Indaial, and that this prevalence is similar to that found in the rest of the country. It was also observed that the number of diabetics in the best age groups of Blumenau and Indaial, is high compared with the country, but is similar to that found for the southern region. However, it is difficult to find elderly diabetic patients without other associated diseases.

In sensitivity to sweet and salty tastes in elderly normal, hypertensive and diabetic hypertensive and only, there was little difference in detection threshold for sucrose and NaCl solutions. With the exception of the detection threshold of the NaCl solution between normal and hypertensive elderly, which shows that elderly hypertensive patients have changes in taste sensitivity and that it could contribute to a high salt intake to high blood pressure.

Faced with such complexity, new studies are needed, so that the knowledge about the decline of taste with age associated diseases is expanded, as well as new proposals for the rehabilitation of the elderly with a healthy and enjoyable.

**REFERENCE**

ABNT – Associação Brasileira de Normas Técnicas. **Teste de sensibilidade em análise sensorial**. São Paulo, 1994.

AMERINE, M.A., PANGBORN, R.M., ROESSLER, E.B. **Principles of sensory of food. New York: Academic Press**, 1965.

ANDREWS, N.; GRIFFITHS, C. **Dental complications of head and neck radiotherapy: Part 1**. J. Austr. Dent., v.46, n.2, p.88-94, 2001.

CAMARGOS, M. C. S.; MACHADO, C. J.; RODRIGUES, R. N. **Diabetes e hipertensão: quantos anos os "jovens idosos" de 60 anos de minas gerais podem esperar viver sem essas doenças?** Anais do XIII seminário sobre a economia mineira,Universidade Federal de Minas Gerais, 2008.

CHAIMOWICZ, Flavio. **A saúde dos idosos brasileiros às vésperas do século XXI: problemas, projeções e alternativas.** Rev. Saúde Pública, v.31: 1997.

DUTKOSKY, SD. **Análise Sensorial dos Alimentos. Curitiba:** Champagnat, 2007.

GOYAZ, M. **Vida ativa na melhor idade.** Rev. UFG, v.5, n.2, 2003. Disponível em: <http://www.proec.ufg.br>. Acesso em: 12 nov. 2004.

KINA, S.; BELOTI, A. e BRUNETTI, R. F. **Alterações da sensibilidade gustativa no paciente idoso.** Atualid. em Ger., v. 3, n. 18, p. 20-2, 1998.

KUSUMOTA. L.; RODRIGUES. R. A. P.; MARQUES. S. **Idosos com insuficiência renal crônica: alterações do estado de saúde.** Rev. Latino-Am. Enfermagem, v.12, n.3, Ribeirão Preto, 2004.

MARQUES. A. C. L. **Relação da higiene bucal com a sensibilidade gustativa e nutrição em idosos.** São José dos Campos, 2006.

MONTEIRO, Marlene Azevedo Magalhães. **Percepção sensorial dos alimentos**. Disponível em: < http://www.ccs.uel.br/espacoparasaude/v10n2/Artigo6%20.pdf>. Acesso em 25 mar 2011.

NOGUES, R. **Factors que afectan la ingesta de nutrientes en El anciano y que condicionan su correcta nutrición.** Nutrición Clínica, v.15, n.2, p.39-44, 1995.

ROLLS, B.J. **Aging and appetite**. Nutrition Reviews, New York, v.50, n.12, p.422-26, 1992.

SARTORELLI, D.S.; FRANCO, L. J. **Tendências do diabetes mellitus no Brasil: o papel da transição nutricional.** Cad Saúde Pública, v.19, p.29-36, 2003.

SASS. A., MARIN. C. F., HATTANDA. C.; SEMPREBOM. K. A., ZIBORDI. R. Q., KANESHIMA. E. N., KANESHIMA. A. M. S. **Qualidade De Vida E Padrão Alimentar De Idosos Institucionalizados Na Cidade De Maringá-PR.** Disponível em: <http://www.cesumar.br/pesquisa/periodicos/index.php/iccesumar/article/viewArticle/92>. Acesso em: 18 mar. 2011.

SBH; Sociedade Brasileira de Hipertensão Arterial, Sociedade Brasileira de Cardiologia, Sociedade Brasileira de Nefrologia. I**V Diretrizes brasileiras de hipertensão arterial.** São Paulo, 2002.

SHUMAN, J.M. Nutrição no envelhecimento. In: MAHAN, L.K., STUMP, S.E. **Alimentos, nutrição e dietoterapia.** 9.ed. São Paulo : Roca, 1998. Cap. 14: p.293-312.

TOSCANO. C. M. **As campanhas nacionais para detecção das doenças crônicas não-transmissíveis: diabetes e hipertensão arterial**. Ciênc. saúde coletiva, v.9, 2004.

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**TASTE PERCEPTION ELDERLY HYPERTENSION AND DIABETES**

**ABSTRACT**

Aging, despite being a natural process the body undergoes several anatomical and physiological. The changes inherent in the process of aging does not mean illness, but the probability of the appearance of pathological processes increases with age. The objective of this study was to evaluate the relationship of hypertension and diabetes with the taste sensitivity in older adults who attend the best age groups. 50 volunteers were selected for study. He used solutions of sodium chloride (NaCl) and sucrose in increasing concentrations. It was concluded that the population is significant in elderly hypertensive patients (70%) in groups with greater age of Blumenau and Indaial, and that this prevalence is similar to that found in the rest of the country. It was also observed that the number of diabetics in the best age groups of Blumenau and Indaial, is high compared with the country, but is similar to that found for the southern region. However, it is difficult to find elderly diabetic patients without other associated diseases. In sensitivity to sweet and salty tastes in elderly normal, hypertensive and diabetic hypertensive and only, there was little difference in detection threshold for sucrose and NaCl solutions. With the exception of the detection threshold of the NaCl solution between normal and hypertensive elderly, which shows that elderly hypertensive patients have changes in taste sensitivity and that it could contribute to a high salt intake to high blood pressure.

**KEYWORDS:** diabetes mellitus, hypertension, elderly.

**L'HYPERTENSION PERCEPTION DU GOÛT ET DE DIABÈTE AGEES**

**RÉSUMÉ**

Le vieillissement, en dépit d'être un processus naturel du corps subit plusieurs anatomiques et physiologiques. Les changements inhérents au processus de vieillissement ne signifie pas une maladie, mais la probabilité de l'apparition de processus pathologiques augmente avec l'âge. L'objectif de cette étude était d'évaluer la relation entre l'hypertension et le diabète avec la sensibilité gustative des personnes âgées qui fréquentent les meilleurs groupes de l'âge. 50 volontaires ont été choisis pour l'étude. Il a utilisé des solutions de chlorure de sodium (NaCl) et du saccharose dans des concentrations croissantes. Il a été conclu que la population est importante chez les hypertendus âgés (70%) dans les groupes avec une plus grande ère de Blumenau et Indaial, et que cette prévalence est similaire à celle trouvée dans le reste du pays. Il a également été observé que le nombre de diabétiques dans les meilleurs groupes de l'âge de Blumenau et Indaial, est élevé par rapport à la campagne, mais est similaire à celle trouvée pour la région sud. Cependant, il est difficile de trouver les personnes âgées diabétiques sans autres maladies associées. Dans la sensibilité aux goûts sucrés et salés dans les personnes âgées normales, la différence hypertendus et diabétiques hypertendus et seulement peu, il y avait dans seuil de détection pour des solutions de saccharose et de NaCl. À l'exception du seuil de détection de la solution de NaCl entre les personnes âgées normales et hypertendus, ce qui montre que chez les hypertendus âgés ont des changements dans la sensibilité gustative et qu'elle pourrait contribuer à un apport élevé en sel de la pression artérielle.

**MOTS-CLÉS:** diabète sucré, l'hypertension, les personnes âgées.

**SABOR, HIPERTENSIÓN Y LA DIABETES EN ANCIANOS**

**RESUMEN**

El envejecimiento, a pesar de ser un proceso natural del cuerpo se somete a varios anatómicos y fisiológicos. Los cambios inherentes en el proceso de envejecimiento no significa enfermedad, pero la probabilidad de la aparición de procesos patológicos aumenta con la edad. El objetivo de este estudio fue evaluar la relación entre la hipertensión y la diabetes con la sensibilidad del gusto de los adultos mayores que asisten a los mejores grupos de edad. 50 voluntarios fueron seleccionados para el estudio. Se utiliza soluciones de cloruro de sodio (NaCl) y sacarosa en concentraciones crecientes. Se concluyó que la población es importante en pacientes ancianos hipertensos (70%) en los grupos de mayor edad de Blumenau y Indaial, y que esta prevalencia es similar a la encontrada en el resto del país. También se observó que el número de diabéticos en los mejores grupos de edad de Blumenau y Indaial, es alta en comparación con el país, pero es similar a la encontrada en la región sur. Sin embargo, es difícil encontrar ancianos pacientes diabéticos sin otras enfermedades asociadas. En la sensibilidad a los sabores dulce y salado en personas mayores diferencias normales, hipertensos y diabéticos hipertensos y sólo poco, estaba allí en el umbral de detección de soluciones de sacarosa y NaCl. Con la excepción del umbral de detección de la solución de NaCl entre ancianos normales e hipertensos, lo que demuestra que los pacientes ancianos hipertensos tienen los cambios en la sensibilidad del gusto y que podría contribuir a una ingesta elevada de sal con la presión arterial alta.

**PALABRAS CLAVE:** diabetes mellitus, hipertensión, edad avanzada.

**PERCEPÇÃO GUSTATIVA EM IDOSOS HIPERTENSOS E DIABETICOS**

**RESUMO**

O envelhecimento, apesar de ser um processo natural, submete o organismo a diversas alterações anatômicas e fisiológicas. As alterações inerentes ao processo de envelhecimento não significam doença, mas a probabilidade do aparecimento de processos patológicos aumenta com a idade. O objetivo deste trabalho foi avaliar a relação da hipertensão e diabetes com a sensibilidade gustativa em idosos que freqüentam grupos da melhor idade. Foram selecionados 50 indivíduos voluntários para a realização do estudo. Usou-se soluções de cloreto de sódio (NaCl) e sacarose em concentrações crescentes. Concluiu-se que é significante a população de idosos hipertensos (70%) em grupos de melhor idade de Blumenau e Indaial, e que essa prevalência é similar ao encontrada no restante do país. Observou-se também que a quantidade de diabéticos nos grupos de melhor idade de Blumenau e Indaial, é elevada em comparação com o país, mas é similar ao encontrado para a região sul. Entretanto, é difícil de encontrar idosos diabéticos sem outras doenças associadas. Em relação à sensibilidade aos gostos doce e salgados em idosos normais, hipertensos e diabéticos e somente hipertensos, foi observada pouca diferença no limiar de detecção às soluções de NaCl e sacarose. Com exceção do limiar de detecção da solução de NaCl entre idoso normais e hipertensos, que permite concluir que idosos hipertensos possuem alterações na sensibilidade gustativa e que o mesmo poderia contribuir para um elevado consumo de sal para o aumento da pressão arterial.

**PALAVRAS-CHAVE:** diabetes Melittus; hipertensão; idoso.